AMENDMENTS TO THE CLAIMS:

Please amend the claims as follows, substituting any amended claim(s) for the corresponding pending claim(s):

1. (Currently Amended) An antenna array system comprising:

a plurality of spaced antenna elements; and

a controller coupled to the antenna elements, the controller determining a magnitude and phase relationship between a first signal sample taken at a first antenna element at a first time and a second signal ~~same~~ sample taken at a second antenna element at a second time, the controller employing the magnitude and phase relationship to compute a projected signal sample for a virtual antenna element based on a ~~second~~ third signal sample taken at the first antenna element at the second time.

2. (Original) The antenna array system according to claim 1, wherein the projected signal sample is employed as a signal sample taken at the virtual antenna element at the first time.

3. (Original) The antenna array system according to claim 1, wherein the plurality of antenna elements are linearly aligned, the antenna array system further comprising:

a plurality of mixers each mixing a signal received at one of the antenna elements with a local oscillator frequency signal;

a plurality of analog-to-digital converters each receiving a mixed output from one of the mixers and converting the mixed output to a digital signal, wherein the controller receive the digital signals and computes the projected signal sample based on the digital signals; and

a digital signal processor receiving the digital signals from each of the analog-to-digital converters together with the projected signal sample from the controller.

4. (Original) The antenna array system according to claim 1, wherein the antenna array system has a beamformed array gain and half power bandwidth proportional to a number of antenna elements greater than a number of the plurality of antenna elements.

5. (Original) The antenna array system according to claim 1, wherein the controller determines multiple magnitude and phase relationships between signal samples taken at different antenna elements at different times and computes a plurality of virtual signal samples.

6. (Previously Presented) The antenna array system according to claim 5, wherein the antenna array system has a beamformed array gain and half power bandwidth proportional to $M+P\bullet(M-1)$, where M is a number of the plurality of antenna elements and P is a number of the virtual signal samples.

7. (Original) The antenna array system according to claim 1, wherein a virtual sensor is achieved by blind mapping, without movement of antenna array elements.

8. (Previously Presented) A system including the antenna array system according to claim 1, the system further comprising:

a plurality of arrays of patch antennas arranged in rows and columns, one of the plurality of arrays including the spaced antenna elements, wherein signals from each patch antenna within a given array are summed in phase,

wherein the controller further comprises a multi-element digital beamformer phasing signals from each of the plurality of arrays to a single point.

9. (Previously Presented) The system according to claim 8, wherein each of the arrays is perturbed in elevation angle with respect to the remaining arrays.

10. (Previously Presented) The system according to claim 8, further comprising:

low noise amplifiers connected to feed points for each of the plurality of arrays; and

a downconverter operating on outputs of the low noise amplifiers.

11. (Previously Presented) The system according to claim 10, wherein the antenna elements, low noise elements, and downconverter are implemented within one module coupled by a fiber cable to a digital signal processor.

12. (Currently Amended) A method of controlling an antenna array system comprising:

determining a magnitude and phase relationship between a first signal sample taken at a first antenna element within a plurality of spaced antenna elements at a first time and a second signal ~~same~~ sample taken at a second antenna element within the plurality of spaced antenna elements at a second time;

employing the magnitude and phase relationship to compute a projected signal sample for a virtual antenna element based on a ~~second~~ third signal sample taken at the first antenna element at the second time.

13. (Previously Presented) The method according to claim 12, further comprising:

employing the projected signal sample as a signal sample taken at the virtual antenna element at the first time.

14. (Previously Presented) The method according to claim 12, wherein the plurality of antenna elements are linearly aligned, the method further comprising:

mixing each signal received at one of the antenna elements with a local oscillator frequency signal;

receiving mixed outputs from the mixing and converting each of the mixed outputs from an analog signal to a digital signal, wherein the projected signal sample is computed based on the digital signals; and

digitally processing the digital signals together with the projected signal sample.

15. (Previously Presented) The method according to claim 12, wherein the antenna array system has a beamformed array gain and half power bandwidth proportional to a number of antenna elements greater than a number of the plurality of antenna elements.

16. (Previously Presented) The method according to claim 12, further comprising:

determining multiple magnitude and phase relationships between signal samples taken at different antenna elements at different times; and

computing a plurality of virtual signal samples.

17. (Previously Presented) The method according to claim 16, wherein the antenna array system has a beamformed array gain and half power bandwidth proportional to M+P•(M–1), where M is a number of the plurality of antenna elements and P is a number of the virtual signal samples.

18. (Previously Presented) The method according to claim 12, wherein a virtual sensor is achieved by blind mapping, without movement of antenna array elements.

19. (Currently Amended) An antenna system comprising:

a plurality of M spaced antenna elements each received signal;

a plurality of M mixers, each mixer mixing a received signal from one of the antenna elements with a local oscillator frequency;

a plurality of M analog-to-digital converters, each analong-to-digital converter converting an output of one of the mixers to a digital signal;

a virtual antenna controller receiving the digital signals, the virtual antenna controller

sampling all of the digital signals at each of a plurality of times,

determining a magnitude and phase relationship between

a first of the digital signals corresponding to the received signal at a first of the M antenna elements at a first time t_1 and

a second of the digital signals corresponding to the received signal at a second of the M antenna elements at a second time t_2, and

employing the magnitude and phase relationship to compute a projected digital signal for a virtual antenna element based on a third of the digital signals corresponding to the received signal at the first antenna element at the second time t_2; and

a digital signal processor operating on, collectively, ~~a fourth of the digital signals corresponding to the received signal at the first antenna element at the second time t_2,~~ the second <u>and third</u> digital signals[[,]] and the projected digital signal.

20. (Previously Presented) The antenna system according to claim 19, wherein the antenna system operates with an array gain and half power bandwidth proportional to an array of M+1 antenna elements.